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Original Article

NONLIGATION AND LIGATION OF HERNIAL SAC TECHNIQUE DURING ORCHIOPEXY FOR PALPABLE UNDESCENDED TESTIS IN CHILDREN: A COMPARATIVE STUDY

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Abstract

Purpose: We prospectively evaluated the surgical outcomes of non ligation of hernial sac technique in children with a palpable undescended testis compared with the traditional hernial sac ligation technique during orchiopexy.

Material and Methods: A total of 34 orchiopexies (30 children with age ranged from 6 months to 5 years) were included and randomly assigned to the non ligation of hernial sac technique orchiopexy group (Group-A, 15 children, 16 testes) and the traditional hernial sac ligation orchiopexy group (Group-B, 15 children, 18 testes). Operation time and surgical complications were compared between the two groups. Complications, testicular location and development of inguinal hernia were assessed at the follow-up evaluation for 6 months postoperatively.

Results: The operation time was significantly shorter in Group-A (34.13±10.3 minutes) than Group-B (73.73±28.97 minutes) (p<0.001). Postoperative complications were found in two cases (wound infection and testicular re-ascent) in Group-B. Wound infection was managed by conservative care and redo surgery was done for testicular re-ascent after 6 months of operation. None of the patients developed post operative inguinal hernia.

Conclusion: We conclude that non ligation of hernial sac technique is a simple procedure that is associated with a shorter operation time than the conventional hernial sac ligation technique during open orchiopexy for palpable undescended testis.

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Introduction

Cryptorchidism is a very common anomaly of the male genitalia, affecting 1% boys at the age of 1 year old, 3% of full-term male infants and 33% in premature babies at birth.[1] About 80% of undescended testes are palpable and 20% are non-palpable.[2]

Patients with undescended testes should be treated because of increased risk of torsion and/or accompanying inguinal hernia, infertility, testicular cancer, as well as because of psychological stigmata.[3] Surgical orchiopexy at the age of 6-12 months, either open surgical procedure for palpable testes or laparoscopy procedure for both diagnosis and management of non palpable intra-abdominal testes are the current options.[4]

The conventional and accepted technique of orchiopexy recommends that ligation of the hernial sac is mandatory for prevention of postoperative hernia. In sac ligation technique it is difficult to separate, hold and ligate the proximal cut end of the hernial sac with multiple small haemostatic forceps, as the sac is very thin and tends to tear easily, and unavoidable trauma may occur to the spermatic cord and spermatic vessels during ligation of the thin sac, moreover separation of very thin sac from

surrounding structure and proximal ligation is a time consuming procedure.[5] Histopathological examination of processus vaginalis demonstrates an inner surface of mesothelium supported by loose connective tissue containing blood vessels and nerves. An inguinal hernial sac has an additional layer of irregularly arranged smooth muscle, which is also present in a patchy distribution in the patent processus vaginalis associated with hydrocele. The significance of this smooth muscle is uncertain, but failed apoptosis of this muscle may have a role in the persistence of a processus vaginalis.[6] As the inguinal hernial sac composed of smooth muscle bundles, only incision and non ligation of hernial sac during inguinal herniotomy can again regenerate the smooth muscle and inguinal hernia may recur. But the sacs associated with cryptorchidism are devoid of smooth muscles and as herniation is not a frequent association with undescended testis, they may not share the same etiological basis with inguinal hernia.[7] During laparoscopic orchiopexy there is no difference between ligation and non ligation of hernial sac.[8] This may be due to the fact that any peritoneal defect closes within 24 hours by metamorphosis of local mesodermal cells.[5]

Materials and Methods

It was a prospective comparative interventional study. This study was conducted in the Department of Pediatric Surgery, Dhaka Shishu Hospital, Dhaka during the period of January 2013 to December 2014. Patients admitted for treatment of palpable undescended testis at Dhaka Shishu Hospital age ranged from 6 months to 5 years. Total 30 patients were included in this study and were divided in two groups. 15 were tagged with non ligation of hernial sac and 15 were tagged with ligation of hernial sac. 15 patients who drawn the non ligation of hernial sac tagged card were included in Group-A where orchiopexy was done by non ligation of hernial sac technique and 15 patients who drawn ligation of hernial sac tagged card were included in Group-B where orchiopexy was done by hernial sac ligation technique.

Patient was placed in supine position on the operative table, after general and caudal anaesthesia, proper painting with povidone iodine and draping was done. Inj. Cephradine (50-100) mg/kg/day was given I.V just after induction of anaesthesia. The incision was made along the inferior inguinal crease line, over the external ring. The external oblique aponeurosis was incised laterally from the external ring in the direction of its fibers, avoiding injury to the ilioinguinal nerve. The steps of this procedure were similar as above mentioned standard, two-incision, inguinal and scrotal approach. In this procedure hernial sac was opened first, it was divided. The proximal end of the divided sac was peeled off with round-ended nontoothed forcep as high as possible to internal ring without damaging the cord structures. Hernial sac (processus vaginalis) was left open; no ligation was made at internal ring. Standard orchiopexy then performed by making subdartos pouch. Absorbable suture (4/0 vicryl) was used for both wound closure. All the patients discharged with advised on first POD, when first POD was the holiday, patient was discharged on next available day. Children attended the Pediatric Surgery operation theater at 1 week, 2 weeks, 1 month, 3 months and 6 months after operation. In each visit patients have assessed clinically. Statistical analyses were performed with SPSS 20. Fisher's exact test was used to test for differences in proportions for categorical variables und unpaired Student's t-test for the differences in means for continuous variables.

Results

Table-I

Patient demographics (n=30)

Variables	Group A (n=15)	Group B (n=15)	P value
Age (months)	32.8±17.8	37.3±17.6	0.495^{ns}
Testicular location			
Superficial pouch	7(46.7%)	11(73.3%)	0.3^{ns}
Inguinal canal	6(40%)	2(13.3%)	
Neck of scrotum	2(13.3%)	2(13.3%)	
Anomaly			
Coronal hypospadias	1(6.7%)	0(00)	1.00^{ns}

Table-II

Comparison of surgical outcome between two groups

Variables	Group A (n=15)	Group B (n=15)	P value
Operation Time (minutes)	34.13±10.3	73.73±28.97	<0.001*
Wound infection	0(00)	1(6.7%)	1.00^{ns}
Orchidectomy	0(00)	1(6.7%)	1.00^{ns}
Testicular re-ascent	0(00)	1(6.7%)	1.00^{ns}
Congestion/swelling of inguinal region	5(33.3%)	6(40%)	1.00^{ns}

Discussion

Cryptororchidism is a very common anomaly of the male genitalia; the etiology of testicular maldescent remains unknown, although recent advances in molecular understanding of testicular descent are shedding some light.[9] Whatever the underlying cause, the undescended testis deserves treatment early in life to prevent loss of spermatogenic potential[2] as infertility was found with unilateral cryptorchid boy up to 10.5% of the patients, as compared to 5.4% of control group,[10] and to allow early detection of testicular malignancy, as 5 to 10 fold increase in malignancy in men with previous history of cryptorchidism compared to those descended testes.[11,12] Despite the recommendations for the treatment of the cryptorchid testis before 1 year of age, many of the patients were older in this study, due to the socio-economic characteristics of the public health system in this country, the lack of parental information and difficult access to tertiary health care.[13]

The main advantage of non ligation of hernial sac technique was less operation time. The mean operative time in this study in Group – A was significantly shorter, 34.13±10.3 minutes than for the Group-B, 73.73±28.97 minutes. The result was similar to Jain et al.[14] He showed 12–40 minute in non ligation of hernial sac technique. They studied 450 cases where the orchiopexy was done without ligation of hernial sac. They have selected the cases where the testes were palpable. None of the patients had clinically demonstrable hernia. Na et al.[15] showed 62.3±35.6 minute for sac ligation technique in their study. A total of 212 children with 287 undescended testes were included and randomly assigned to the single scrotal incision orchiopexy group (Group I, 107 children, with 146 testes) and the traditional inguinal incision orchiopexy group (Group II, 105 children, with 141 testes). The entire child presented with palpable testes. In all cases, orchiopexy was done by hernial sac ligation technique. Post operative follow up was 12 months.

In this series, 1 patient (3.33%) in Group–B, developed scrotal wound infection that was managed by antibiotic treatment; Ramzan et al.[16] showed the wound infection was 4.4% in their study. They studied total of 268 cases. The study was prospective, comparative and randomization was done by lottery method, all children were put into two equal groups. Each group had 134 cases. In group–A, orchiopexy was performed through single low scrotal incision. In group–B, classic two incision, one in the inguinal region another in the scrotal approach was used. All the cases were followed up to 12 months after surgery. They showed scrotal hematoma was 2.2%, wound infection was 1.4%, mean operation time was 28.32±0.92 min, mean hospital stay was 1.027±0.205 days and testicular ascent was 2.2% in group – A; scrotal hematoma was 4.4%, wound infection was 4.4%, mean operation time was 47.83±0.76 min, mean hospital stay was 3.023±0.203 days and secondary ascent was 1.4% in group–B.

One patient (3.33%) developed testicular re-ascent in Group -B; the case was managed by redo surgery after 6 months of operation; Eltayeb[17] showed 2.8% testicular re-ascent in his study. He conducted a randomized controlled study on 70 children with palpable unilateral undescended testis regardless to the site of the testicular location.. The patients were randomly divided into two equal groups: (Group I) had their orchiopexy done through high single scrotal incision and (Group II) had their orchiopexy done through the classic inguinal approach. Age of the children was ranged from 10 months to 6 years. In all cases, orchiopexy was done by hernial sac ligation technique. Post operative follow up was 3 months to 12 months. Testicular re-ascent was 2(5.7%) cases in Group I and 1(2.8%) case in group II. Ramzan et

al.[16] showed the secondary ascent was 1.4% in traditional orchiopexy group.

None of the patients developed scrotal hematoma, post operative inguinal hernia & post operative testicular atrophy in this series. The similar result was described by Kumari et al.[5], Jain et al.[14] and Na et al.[15] Kumari and others conducted a prospective study, a total of 50 children with age range of 8 months to 12 years with palpable undescended testes were included. Clinically no cases presented with hernia. All of them underwent standard orchiopexy without ligation of the hernial sac. Follow-up of all cases ranged between 1.5 years to 3 years. No inguinal hernia was detected during follow-up in any child.

The mean ages in this study in Group–A & Group-B were 32.8±17.8 and 37.3±17.6 months, which were similar to Na et al.[15] they showed the mean ages in their study group I & II were 40.1±10.3 and 41.8±11.4 months respectively. Jain et al.[14] showed 70% child was 6 months to 2 years old, 25% child was 2–5 years of age and only 5% child was 5–10 years of age in their study. According to Mouriquand[1], the incidence of cryptorchism can rise up to 33% in pre-mature boys and in this study it was 26.7% in the both groups.

Associated coronal (anterior) hypospadias found in 1 patient in Group – A, the association was 3.33%; Duckett[18] showed 5% anterior hypospadias was associated with undescended testis in his study. He showed the incidence of hypospadias was about 1 in every 300 male children. If the minor degree hypospadias was included, the incidence was as high as 1 in 125 male births. In posterior hypospadias, this incidence for undedcended testis was 32%, and with middle and anterior hypospadias was 6% and 5% respectively.

In this study, Unilateral undescended testes were 93.33% and bilateral were 6.66% in Group–A; Unilateral undescended testes were 80% and bilateral were 20% in Group–B. Na et al.[15] showed unilateral undescended testes were 63.66% and bilateral were 36.44% in Group I; unilateral cases were 65.71% and bilateral were 34.28%. Disparity of the result between the two studies is probably due to small sample size in this series. They studied total of 212 children with 287 undescended testes.

Per operative location of testes in this study were in superficial inguinal pouch 60%, in inguinal canal 26.66% and in the neck of the scrotum 13.33%. Sumfes[19] found the similar distribution, which were in superficial pouch 54%, in inguinal canal 20% and in the neck of the scrotum 8%. Ghnnam et al.[20] found in the superficial inguinal pouch 64.1% and 35.6% intra-canaliculicular testis in their study. Their study was prospective and randomization was present, they studied a total of 159 patients with 185 undescended testes age ranging from 5 months to 14 years with the mean age of 49.5±33.3 months and their follow up period was 3 years.

A testis was needed to remove from a patient with bilateral undescended testes in Group–B; the rate of orchidectomy was 3.33%. Ductus deferens was rudimentary and connection between it and epididymis was disrupted as well as continuity between epididymis and gonad was lost, and the affected testis was smaller than opposite one. David & Iyekoretin[21] showed the rate of orchidectomy was 11.6% in their study and the increased rate of orchidectomy was due to atretic testis as they worked with children more than 5 years of age. Hutson et al[22] mentioned clinical atrophy of the testis can be detected by 5 – 7 years of age. Koff & Scaletscky[23] mentioned about simple epididymal elongation to more complex form of epididymal abnormalities. Overall abnormal epididymis was found 88% in their series. Sumfest[19] showed 32–79% of undescended testes were associated with some type of epididymal abnormality; however, abnormalities that inhibit sperm transport (eg, complete caput separation, atresia, agenesis) had only 8% patients with cryptorchidism.

In this study overall complication of orchiopexy was 6.66% that was similar to Thorup et al.[24] They showed complication rate was <5%. Domico[25] showed success rate was 89% for inguinal testes.

This study encountered encouraging outcome with easy technique and reduced operative time can be a better alternative to a meticulous dissection and routine hernial sac ligation technique during orchidopexy in palpable undescended testes where the associated inguinal hernia is absent. The fact that there was no difference in the development of post operative inguinal hernia after orchiopexy in both groups may directly support this point of view.

Conclusions

This study concludes that non ligation of hernial sac technique is a simple procedure that is associated with a shorter operation time than the conventional hernial sac ligation technique during open orchiopexy for palpable undescended testis. But for definite conclusion, larger sample sizes comprising a greater number of cases are required and long term assessment is still needed to establish this method.

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